

Claims

What is claimed is:

1. A method of manufacturing an optical fiber preform, comprising the steps of:
 providing a process gas,
 purifying the process gas, by adsorption, to remove transition metal impurities therein
without causing a chemical conversion reaction during purifying, and
 exposing, in a furnace, an optical fiber soot preform to the purified gas.
2. The method of claim 1 wherein the step of exposing is accomplished during the process of
drying, doping or consolidating.
3. The method of claim 1 wherein the process gas purified further comprises a halogen-
containing gas.
4. The method of claim 3 further comprising a step of routing the halogen-containing gas
through a distributor apparatus prior to the step of purifying.
5. The method of claim 3 wherein the halogen-containing gas is selected from the group
consisting of:
 a chlorine-containing gas, and
 a fluorine-containing gas.
6. The method of claim 3 wherein the halogen-containing gas is mixed with an inert gas prior to
purification.
7. The method of claim 3 wherein the process gas is a halogen-containing gas selected from the
group consisting of Cl_2 , SiCl_4 , GeCl_4 , POCl_3 , COCl_2 , SOCl_2 , CF_4 , SiF_4 , C_2F_6 , BF_3 , and C_3F_8 .

8. The method of claim 1 wherein the process gas is a chlorinated gas selected from the group consisting of Cl_2 , SiCl_4 , GeCl_4 , POCl_3 , COCl_2 , and SOCl_2 .
9. The method of claim 1 wherein the step of purifying removes at least one impurity selected from the group consisting of an iron-containing compound, a nickel-containing compound, chromium-containing compound, and copper-containing compound.
10. The method of claim 9 wherein the impurity is a metal chloride.
11. The method of claim 1 further comprising a step of routing through a distributor apparatus to control the flow rate of the process gas.
12. The method of claim 1 wherein the step of purifying comprises passing the process gas through a porous media.
13. The method of claim 12 wherein the porous media comprises a zeolite.
14. The method of claim 12 wherein the porous media comprises an oxide.
15. The method of claim 14 further comprising a metal oxide wherein the metal is selected from the group consisting of metals from Group IA, IIA, IIIB, IVB, Zn, B, Al, Si and P.
16. The method of claim 14 wherein the porous media comprises a metal oxide wherein the metal is selected from the group consisting of Mg, Ca, Al, Si, Ti and Zr.
17. The method of claim 1 wherein the step of purifying takes place at a temperature of below about 200°C .

18. A optical fiber preform manufacturing apparatus, comprising:
a source of process gas,
a metal removing adsorber connected the source and adapted to purify the process gas
and remove transition metal impurities therein without causing a chemical conversion reaction,
and
a consolidation furnace connected to the metal remover, the furnace adapted to contain a
soot preform.
19. The apparatus of claim 18 wherein the process gas comprises a halogen-containing gas.
20. The apparatus of claim 18 further comprising a distributor connected to the source, the
distributor operable to control a flow rate of the process gas.
21. The apparatus of claim 18 wherein the metal removing adsorber comprises a porous media.
22. The apparatus of claim 21 wherein the porous media comprises a metal oxide.
23. The apparatus of claim 22 wherein the metal in the metal oxide is selected from the group
consisting of Mg, Ca, Al, Si, Ti, and Zr.
24. The apparatus of claim 18 wherein the metal removing adsorber comprises an assembly of at
least two metal removers arranged in parallel relation.
25. The method of claim 24 wherein a first gas from the source is directed to a first one of the at
least two metal removers and a second gas from the source is directed to a second one of the at
least two metal removers.
26. The method of claim 25 wherein the first gas includes a chlorinated gas and the second gas
includes a fluorinated gas.

27. The method of claim 25 wherein the first gas includes a chlorinated gas and a second gas includes an inert gas.

28. The method of claim 25 further comprising a third metal remover connected to a third gas from the source.

29. A method of manufacturing an optical fiber preform, comprising the steps of:
 providing a chlorinated process gas where chlorine is the only halogen,
 purifying, by adsorption, the chlorinated process gas to remove gaseous transition metal impurities therein without causing a chemical conversion reaction during purifying, and
 exposing, in a furnace, an optical fiber soot preform to the purified process gas to dry or dope the soot preform.